A Demonstration of Submerged Aquatic Vegetation/Limerock Treatment System Technology for Removing Phosphorus From Everglades Agricultural Area Waters

First Monthly Report

Prepared for:

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July 2, 1998

Introduction

On February 12, 1998, the District contracted with DB Environmental Laboratories, Inc. (DBEL) to design, construct, operate, and evaluate a 13-month, tank-scale (i.e., "mesocosm") demonstration of SAV/ Limerock Treatment System technology for reducing P discharge from EAA waters. The objectives of this project are twofold. First, obtain the performance data and operational experience necessary to evaluate the technical, economic, and environmental feasibility of using SAV/Limerock technology for P removal at either the watershed basin- or farm-scale. Second, guide the design and operation of a larger, field-scale SAV/Limerock demonstration project should the District choose to investigate this technology further. This report summarizes progress during the fourth month (project weeks 13 - 16) by DB Environmental Laboratories, Inc. (DBEL) on the Submerged Aquatic Vegetation/Limerock (SAV/LR) demonstration project.

Synopsis of Progress to Date

North Project Site

Late May 1998 was an acclimation period for the submerged macrophytes that we stocked into the nine hydraulic retention time (HRT) study mesocosms. Tissue analyses were completed on these plants, with average composition (based on ten samples) of the two dominant macrophytes as follows.

- *Ceratophyllum*: 5.6% dry matter content, 2.10% N, 0.29% P, 36.2% C, and 7.1% Ca.
- *Najas*: 6.0% dry matter, 1.90 % N, 0.16% P, 33.6% C, and 10.9% Ca.

These analyses will be repeated at the end of the study to facilitate P mass balance calculations.

We also completed analyses of the peat substrate in each mesocosm. The mean concentrations (based on ten samples) for bulk density, N, P, C and Ca are 0.18 g/cc, 2.6%, 0.02%, 44.8% and 6.4%, respectively.

On May 15, we adjusted flow rates to the macrophyte mesocsoms to achieve HRTs of 1.5, 3.5 and 7 days. On June 11, we collected the first grab samples of the influent and effluent waters to the mesocosm tanks.

On June 17, we established flows into the limerock mesocosms (providing HRTs in the limerock unit process of 1 hr and 5 hrs), and on June 19, we performed the first water quality sampling on the entire SAV- LR process train. The next monthly report will contain results of our first water quality sampling efforts.

South Project Site

During May 1998 we stocked plants into the 0.5 m deep mesocosms and 0.1 m deep raceways at this location. All units received a mixture of *Ceratophyllum*, *Najas*, *Chara* and associated periphyton. Plant samples were collected for analysis of initial tissue composition.

On June 4, DISTRICT maintenance personnel began a week-long project of dredging submerged macrophytes from the canal that feeds the ENR effluent pump station. The turbid waters that resulted from this activity fouled the macrophyte and periphyton communities in the influent regions of our mesocosms. We curtailed flow to the mesocosms until the dredging was completed. The turbid water conditions did not result in any long-term adverse impact to our mesocosms, but it did delay the startup of water sampling at this location by about three weeks.

Despite the ephemeral turbidity problems, the plant communities in the mesocosms at this location are robust. Both the macrophytes and periphyton appear to be thriving in the low nutrient waters. Results of our first water quality samples will be provided in the next monthly report.